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भारतीय मानक

प्रकाशिक तंतु

भाग 1 मापन विधियाँ और परीक्षण प्रक्रियाएँ

अनुभाग 50 नम ऊष्मा (स्थायी अवस्था)

Indian Standard

OPTICAL FIBRES

PART 1 MEASUREMENT METHODS AND TEST PROCEDURES

Section 50 Damp Heat (Steady State)

SCS 33.180.10

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BUREAU OF INDIAN STANDARDS
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NEW DELH1110002

July 2009 **Price Group 2**

Fibre Optics, Fibres, Cables and Devices Sectional Committee, LITD 11

NATIONAL FOREWORD

This Indian Standard (Part 1/Sec 50) which is identical with IEC 60793-1-50 : 2001 'Optical fibres — Part 1-50: Measurement methods and test procedures — Damp heat (steady state)' issued by the International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the Fibre Optics, Fibres, Cables and Devices Sectional Committee and approval of the Electronics and Information Technology Division Council.

The text of IEC Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to the following International Standard for which Indian Standard also exists. The corresponding Indian Standard which is to be substituted in its place is listed below along with its degree of equivalence for the edition indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
IEC 60068-2-3 : 1985 Environment testing — Part 2: Tests — Ca: Damp heat, steady state	IS 9000 (Part 4) : 1979 Basic environment testing procedures for electronic and electrical items: Part 4 Damp heat (steady state)	Technically Equivalent

The technical committee responsible for preparation of this standard has reviewed the provisions of the following International Standards and has decided that they are acceptable for use in conjunction with this standard:

International Standard	*Title*
IEC 60793-1-32:2001	Optical fibres — Part 1-32: Measurement methods and test procedures — Coating strippability
IEC60793-1-40:2001	Optical fibres — Part 1-40: Measurement methods and test procedures — Attenuation
IEC 60793-2:1998	'Optical fibres — Part 2: Product specification

Only the English language text in the International Standard has been retained while adopting it in this Indian Standard, and as such the page numbers are not the same as in the IEC Standard.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 :1960 Rules for "rounding off numerical values *{revised)'.The* number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

IS/1EC 60793-1-50: 2001

Indian Standard

OPTICAL FIBRES

PART 1 MEASUREMENT METHODS AND TEST PROCEDURES

Section 50 Damp Heat (Steady State)

1 Scope and object

This part of IEC 60793 provides a practical method for evaluating fibre performance in a defined environment.

The purpose of this standard is to determine the suitability of optical fibre (types A1 a to A1 d and 61 to B4) to withstand the environmental condition of high humidity and high temperature which may occur in actual use, storage and/or transport. The test is primarily intended to permit the observation of effects of high humidity at constant temperature over a given period.

NOTE The applicability of this test to other fiber types is under study.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60793. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60793 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of I EC and ISO maintain registers of currently valid International Standards.

IEC 60068-2-3:1985, *Environmental testing - Part 2: Tests - Test Ca; Damp heat, steady state*

IEC 60793-1-32, *Optical fibres - Part 1-32; Measurement methods and test procedures -Coating strippability*

IEC 60793-1-40. *Optical fibres - Part 1-40: Measurement methods and test procedures -Attenuation*

IEC 60793-2:1998, *Optical fibres - Part 2: Product specifications*

3 Apparatus

3.1 Chamber

The apparatus consists of an environmental chamber in accordance with IEC 60068-2-3, Test Ca. The chamber shall be capable of housing the specimen and of allowing access for measurement during conditioning. It shall also be capable of maintaining the specified temperature and humidity within the specified tolerances. Forced air circulation may be used to maintain homogeneous conditions. The chamber and accessories shall be constructed and arranged in such a manner as to avoid condensation dripping on the specimen.

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3.2 Humidifier

Demineralised or de-ionised water is used to obtain the specified humidity. No rust or corrosion contaminants shall be imposed on the specimen by the test facility. The water added to the humidifier shall be controlled according to the manufacturer's instructions.

3.3 Other apparatus

Additional apparatus may be necessary to perform the examinations and measurements (or as specified in the detail specification).

4 Sampling and specimens

For optical measurements, the length of the specimen shall be at least 1 000 m for fibre types A1a to Aid, and at least 2 000 m for fibre types B1 to B4, to allow the required measurement repeatability. The amount of the specimen outside of the test chamber shall be minimised, and if it exceeds 10 % of the overall specimen length, this should be reported.

The preparation of the specimen shall have no detrimental effect on the fibre whilst under test conditions. Unless otherwise defined in the detail specification, it is recommended that the fibre sample be loosely coiled and dusted with a material such as talcum powder, to allow the coils to move freely against each other. The specimen may be coiled horizontally or vertically, with a minimum bend diameter of 150 mm to avoid any macro-bending effects. If the specimen is to be sprinkled with talc, then a piece of un-powdered fibre from the specimen should be exposed to the test environment. This piece of fibre shall be of sufficient length to enable any physical examinations to be performed before and after the test.

A control length of the specimen shall be removed prior to the test to enable the completion of required mechanical measurements for comparison to measurements made after the test. This control length should not be sprinkled with talc.

5 Procedure

Conduct the procedure in accordance with IEC 60068-2-3, Test Ca, with the temperature, humidity and exposure time as given below:

Temperature	Relative humidity	Exposure time
+85 °C	+85 %	30 days

5.1 Measurements

5.1.1 Optical measurements

Attenuation measurement shall be carried out at the wavelength specified in the relevant specification using IEC 60793-1-40, before, during (once the specimen has stabilized at the specified temperature and relative humidity) and after the test. Attenuation changes shall be recorded.

NOTE If the cut-back method (IEC 60793-1-40. Method A) is used, take care to track the length(s) cut over the series of measurements. If the insertion loss method {Method B) is used, the stability of the connections over time should be verified. If Method C is used, care should be taken to ensure the results against measurement drift. Spectral modelling (Method D), is not applicable.

5.1.2 Mechanical measurements

The fibre average coating strip force shall be measured before and after the test, using the method described in IEC 60793-1-32. The control specimen (see clause 4) is used to evaluate the change in strippability.

5.2 Preconditioning

If specified, the specimen shall be preconditioned, as required by the detail specification.

5.3 Conditioning

Stabilise the chamber and the specimen to standard atmospheric conditions prior to the reference measurements being taken.

Adjust the chamber temperature and humidity to the specified severity. Allow the specimen to reach temperature stability and maintain the temperature and humidity for the duration specified.

At the completion of the test, allow the specimen to remain in the chamber while the temperature is reduced to standard atmospheric conditions. The rate of change of temperature shall not exceed 1 °C/min, averaged over a maximum period of 5 min. The detail specification may call for measurements during conditioning. If so required, the detail specification shall specify the measurements to be taken and when to take them. Do not remove the specimen(s) from the chamber whilst these measurements are being made.

5.4 Recovery

Unless otherwise required by the relevant specification, the "specimen shall remain under standard atmospheric condition for recovery for a period greater than 12 h but not more than 48 h. The detail specification may call for measurements during recovery. If so required, the detail specification shall specify the measurements to be taken and when to take them.

6 Pass/fail criteria

The relevant specification limits for attenuation change and strip force measurements can be found in the relevant specification (e.g. IEC 60793-2).

7 Results

7.1 Information to be provided with each test

- Date and title of test
- Identification of specimen
- Length of specimen
- Nominal wavelength(s) at which the test was performed
- Attenuation change measurements
- Coating strip force measurements

7.2 Information to be provided upon request

- Description of all key equipment

8 Specification information

The detail specification shall specify the following information:

- failure and acceptance criteria;
- information to be reported;
- any deviations to the procedure that apply.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard alongwith amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

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